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ABSTRACT

This report is intended to assist those agencies considering using California's Probation Officer Examination as a tool for selecting personnel. It is intended to provide agencies with guidance in setting test cutoff scores rather than an exhaustive discussion of all of the factors that must be considered before setting cutoff scores for actual operational use. The following topics are discussed: the nature and purpose of cutoff scores in general, facts about the development of the Probation Officer Examination that must be considered when selecting a cutoff score for it, factors that influence and are influenced by the choice of a cutoff score, and the recommended method for setting cutoff scores and using the Probation Officer Examination to augment entry-level selection decisions. (MN)

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STANDARDS AND TRAINING
FOR CORRECTIONS PROGRAM

STC

BOARD OF CORRECTIONS

CUTOFF SCORE REPORT

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PROBATION OFFICER

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In preparing the Probation Officer Examination for the California Board of Corrections, Personnel Decisions, Inc. has taken into account the following documents concerning selection testing:

- The American Psychological Association, Standards for Educational and Psychological Tests, (1974).
- The APA Division of Industrial-Organizational Psychology, Principles for the Validation and Use of Personnel Selection Procedures, 2nd edition, (1980).
- The Equal Employment Opportunity Commission, Uniform Guidelines on Employee Selection Procedures, (1978).

INTRODUCTION

The Probation Officer Examination was developed as a result of a three-year statewide analysis of the Probation Officer position. This research demonstrated that the examination is a fair and valid indicator of potential to successfully perform the probation officer job. The Probation Officer Examination is intended for use by corrections agencies to assist in making selection decisions about candidates for entry-level probation officer positions. It is neither intended nor appropriate for use as the sole or even primary basis for making such selection decisions. Its judicious use, in combination with other sources of information about candidates' potential, and according to the guidelines set forth in the Validation Report, User's Manual, and this document, will increase the probability that selected candidates will be successful probation officers.

This report serves four functions:

- To review the nature and purpose of cutoff scores in general;
- To recommend and justify a minimum acceptable Probation Officer Examination score;
- To review the factors that influence and are influenced by the choice of the cutoff score; and
- To recommend a method to be used in setting cutoff scores and using the Probation Officer Examination to augment entry-level selection decisions.

This report is not a guide to the administration or use of the Probation Officer Examination. Agencies considering the Probation Officer Examination for inclusion in their selection process should carefully review the job analysis and the validation reports (available from the Board of Corrections). The Probation Officer Examination User's Manual (also available from the Board of Corrections) provides detailed administration guidelines, as well as verbatim proctoring instructions for the exam. This report provides agencies with guidance in setting cutoff scores, but it is not an exhaustive discussion of all the factors that must be considered before setting cutoff scores for operational use. It is strongly recommended that users of the Probation Officer Examination confer with an STC program consultant prior to their first use of the examination.

Technically and legally, it is not a test <u>per se</u> that is validated; rather, it is the entire selection process administration, scoring, and use that must meet all technical and legal requirements of validity and fairness. Because cutoff scores in large part determine how a selection procedure is used, they are an integral part of any selection procedure. The validity and fairness of the Probation Officer Examination cannot be considered in isolation of the cutoff score used when the exam is implemented.

Setting a cutoff score cannot, therefore, be undertaken lightly. An appropriate cutoff score goes a long way in enhancing the usefulness and operational validity of any selection procedure. This report discusses the type of cutoff scores most appropriate for use with the Probation Officer Examination. Several methods of integrating Probation Officer Examination scores into an existing selection process are reviewed, including a discussion of the factors that influence the choice of methods.

Nature and Interpretation of Cutoff Scores

Most simply, a cutoff score is the point in the distribution of examination scores that separates acceptable from unacceptable performance. Within this broad definition it is possible to distinguish two types of cutoff scores: minimum competency and flexible. Functionally the two types of cutoff scores are used in much the same way. The distinction between minimum competency and flexible cutoff scores involves the nature of the scores and the interpretation attached to each.

Minimum competency cutoff scores. Minimum competency cutoff scores define rigid performance standards. Persons whose scores lie below a minimum competency cutoff do not possess sufficient quantity of a skill or ability for successful performance of a job. Minimum competency cutoff scores segregate candidates into two groups: those who meet job requirements and those who do not. Determining appropriate minimum competency cutoff scores is often quite difficult and there is considerable technical controversy surrounding the methods that have been proposed for setting minimum competency cutoffs. Conceptually, minimum competency cutoff scores impose an "all or nothing" interpretation on test scores. Persons who score above such a cutoff are considered equally acceptable candidates. No distinction is made between candidates scoring just above the cutoff and those scoring well above the minimum competency cutoff scores, more of the assessed skill or trait beyond the cutoff is not necessarily better.

Flexible cutoff scores. As their name suggests, flexible cutoff scores do not define rigid performance standards as do minimum competency cutoff scores. Flexible cutoff scores are set for administrative reasons. A flexible cutoff is usually set because there are a limited number of job openings relative to the number of candidates available to fill them. Flexible cutoff scores do not have strict interpretations as do minimum competency cutoffs. Persons whose scores lie below a flexible cutoff cannot be said not to meet job standards; indeed, they may be well qualified. Flexible cutoffs do not separate unqualified from equally well qualified candidates. For those who score above the cutoff, more of the skill or ability indicates better qualifications.

In practice, the type of cutoff score set for a given selection procedure is usually not as cut-and-dried as these definitions may suggest. There is considerable controversy over the appropriate methods to determine minimum competency cutoffs. Even in those cases where legally defensible minimum competency cutoffs can be set, it is often necessary to use a cutoff above the minimum to actually make selection decisions. This occurs whenever the number of candidates who score above a minimum competency cutoff is much greater than the number of positions to be filled, requiring a further winnowing of candidates.

Persons familiar with the educational and psychological literature concerning the development and use of tests may recognize the similarity between the concepts of minimum competency and flexible cutoff scores on the one hand, and the concepts of mastery and norm referenced testing on the other. The issues involved with each of these concepts are much the same. Additional useful information about cutoff scores can be found in:

McClung, G.G. (1974). Considerations in Developing Test Passing Points. Chicago: International Personnel Management Association.

Cutoff Scores for the Probation Officer Examination

Because of the methods used to develop and validate the Probation Officer Examination, it is not appropriate to set or use minimum competency cutoff scores. The Probation Officer Examination orders candidates according to their potential to perform the probation officer job. The examination measures a variety of knowledges, skills and abilities important for successful job performance. It is internally compensatory in the sense that poor performance on one ability or trait can be compensated by strong performance on another. It is therefore not possible to set a cutoff score that clearly separates capable from incapable candidates. Nevertheless, it is possible to recommend a minimum acceptable score.

Hiring candidates entails a calculated risk on the part of a hiring agency. An agency will invest considerable time, effort and money in selecting and training candidates. Because of this investment of resources it is appropriate for an agency to expect a reasonable "return on investment". In personnel selection, "return on investment" translates as the percentage of selected applicants who prove to be successful incumbents.

To arrive at a recommendation about the minimum acceptable score, data from 284 probation officer incumbents were used. (i.e., those who completed the Probation Officer Examination and whose job performance was rated during the validation research). Incumbents were rated on 32 scales pertaining to effectiveness in areas such as investigating, monitoring and enforcing compliance and motivation. For each incumbent, the 32 ratings were combined into a single index of overall job performance. Details of the methods used to arrive

at the overall effectiveness criterion are contained in the "Validation Report for the Job of Probation Officer" (available from the Board of Corrections). Successful job performance was defined as a criterion score at or above the average of all rated incumbents. Approximately 50% of incumbents received a criterion score that met this definition. In other words, for the purpose of this research, approximately one-half of current incumbents are considered satisfactory probation officers. Based upon this estimate and upon an estimated operational validity of .30, Taylor-Russell (1939) and Lashe (1958) expectancy tables were consulted to determine, for seven score ranges, the probability that incumbents with scores in a given range would meet the definition of successful job performance. Results of this analysis are presented in Figure 1. It is recommended that agencies not invest in a candidate unless there is at least a 50/50 chance that the candidate will be a successful probation officer. On the basis of Figure 1, this recommendation means that agencies should probably not consider applicants whose Probation Officer Examination scores are below 115.

It must be clear that the recommended minimum acceptable score is based upon consideration of selection costs and utility. It is not a minimum competency cutoff score, nor should it be interpreted as such. It does not represent a score below which candidates fail to meet minimum job requirements. Conversely, scores above the recommended minimum acceptable score do not necessarily indicate that candidates meet all minimum job standards. The minimum acceptable score represents that point at which agencies are likely to achieve a reasonable return on their investment in candidates.

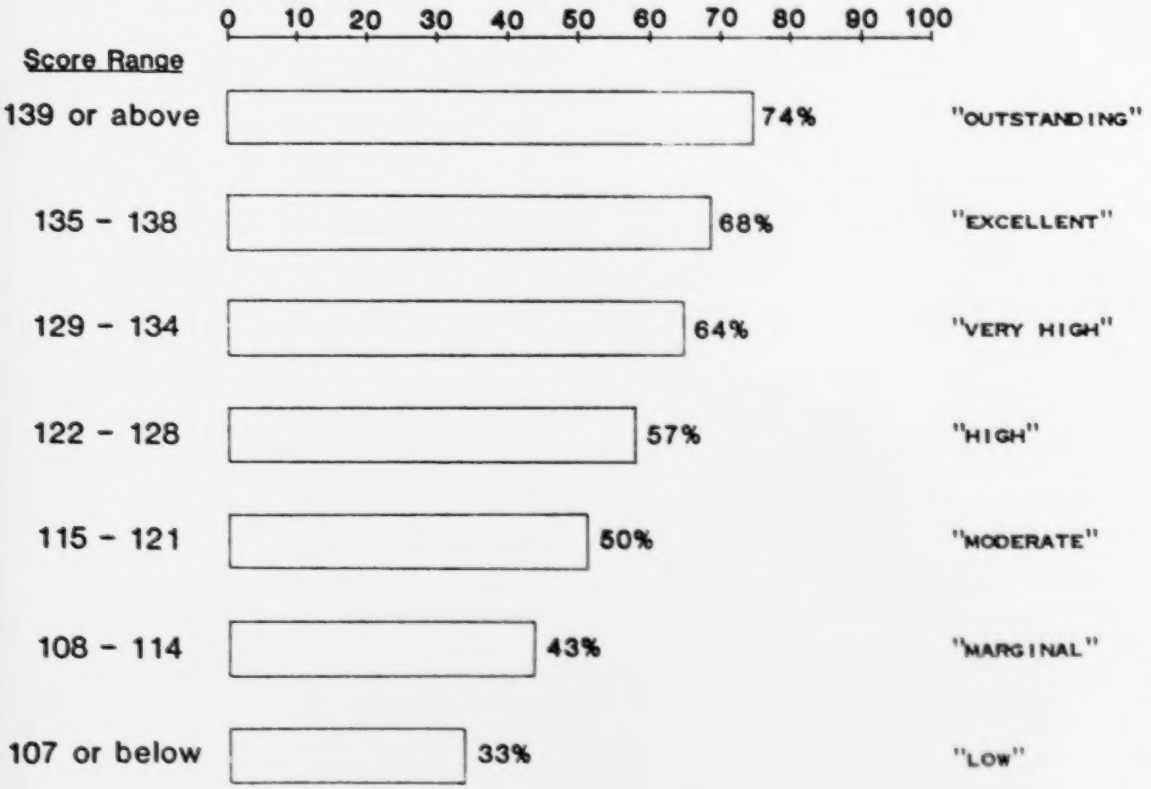
Using Scores to Augment Selection Decisions

There are two approaches to using examination scores to make selection decisions.

The first is to use an exam as a pass/fail screening device. A cutoff score is set and, without regards to their relative examination performance, all candidates who score above the cutoff are passed on to the next step in the selection process. This is a simple method of using a test to make selection decisions but, because the entire utility of the decision is concentrated at the cutoff score, care must be taken in choosing that cutoff.

The second approach to incorporating examination scores in selection decisions is to use scores to rank order candidates. In its simplest form this approach orders candidates by score. Positions are filled by selecting candidates in order from the highest to lowest score, until all available positions have been filled. In this approach cutoff are set by default in that the number of positions determines the operational cutoff score.

Figure 1. Probability of Success for Seven Probation Officer Examination Score Ranges.



The approach an agency takes to incorporating the Probation Officer Examination into its selection process will depend upon several factors. One factor is whether the agency uses a multiple hurdle or compensatory approach to selection. A multiple hurdle approach usually requires that the exam be used as one of several pass/fail hurdles that candidates must exceed during selection. A compensatory selection process on the other hand lends itself most readily to the rank order use of the Probation Officer Examination. Here exam scores can be carried forward to later steps and relatively low exam scores can be compensated, for example, by relatively high interview marks.

Regardless of the selection process used by participating agencies, it is recommended that the Probation Officer Examination be placed early in the overall selection process. There are two reasons for this recommendation: the first concerns the technical relationships among the parts of a multi-step selection process; the second concerns issues of cost effectiveness. Placing the Probation Officer Examination early in the selection process will usually permit the use of a more restrictive (i.e., higher) cutoff score. Use of a restrictive cutoff score has two beneficial consequences. First, it enhances the operational validity of the Probation Officer Examination. Operational validity is an index of selection effectiveness. The higher the operational validity of an examination, the fewer the number of selected candidates who fail to become successful probation officers. A restrictive cutoff score also ensures an initial pool of high quality candidates. This allows later selection steps to concentrate on detecting the more subtle nuances that distinguish more qualified from less qualified candidates.

Second, cost effectiveness considerations argue for placing the Probation Officer Examination early in the selection process as well. Testing is perhaps the most economical method of screening large numbers of candidates. Much less time, effort, and money are invested by an agency in testing a candidate than in interviewing the candidate. It is appropriate for agencies to attempt to minimize their investment in candidates who will not eventually be selected. Placing the Probation Officer Examination early in the selection process is one way agencies can minimize their investment in unacceptable candidates.

Setting an Operational Cutoff Score

To set a cutoff score, two pieces of information must be known: (1) the number of candidates to be tested, and (2) the number of candidates that will be permitted to go to the next step in the selection process (or the number of job openings if testing is the last selection step). Given these two numbers, it is possible to estimate the selection ratio (the number passed, divided by the number tested) necessary to ensure that a sufficient number of

candidates are passed to the next selection step. Table 1 provides the raw scores that, based on the scores of probation officer incumbents, should yield a wide range of selection ratios. To set a cutoff score an agency simply chooses the raw score that is closest to providing the necessary selection ratio.

After the examination has been administered and scored, it may be necessary to adjust the cutoff score slightly so that neither too few nor too many candidates pass. If an agency is not able to raise cutoff scores after the examination has been scored, but is able to lower the cutoff, the necessary selection ratio should be estimated as conservatively as possible. This is done by estimating the minimum number of candidates to be permitted on to the next step in the selection process; and by estimating the maximum number of candidates that can reasonably be expected to be tested. These estimates will yield a low selection ratio and a high cutoff score that can be lowered as necessary to ensure that a sufficient number of candidates pass the exam.

Table 1.
Selection Ratios for Various Probation Officer Examination Raw Scores

Necessary Selection Ratio	Examination Cutoff Score
.01	148
.05	139
.10	135
.15	132
.20[a]	129
.25	127
.30	125
.35	123
.40	122
.45	120
.50	118
.55	117
.60	115[b]
.65	114
.70	112
.75	110
.80	108
.85	105
.90	102
.95	98
.99	89

[a]Selection ratios of .20 or less may result in unfair adverse impact against minority candidates.

[b]Recommended minimum acceptable score = 115.

If it is not possible to estimate the number of candidates to be tested or the number to be permitted to the next step in the selection process, the following alternative method may be used to set a cutoff score. This method begins with setting as high a cutoff score as is possible without incurring adverse impact against protected groups. Unless data are available indicating that higher scores will not result in adverse impact, a score of 129 is recommended as the initial cutoff. After the exam is administered it is necessary to determine the number of candidates who passed. If the number passing is sufficient to meet the needs of the next selection step, no further adjustments are necessary. If not, the cutoff must be lowered, one point at a time, until a sufficient number of candidates pass the examination.

After the Probation Officer Examination has been administered, scored, and a cutoff score chosen, it is important that agencies determine whether the cutoff results in adverse impact against ethnic minority candidates. Cutoff scores that result in overall selection ratios of .20 or higher are not likely to yield such adverse impact. Fluctuations in the number and qualifications of candidates could, however, lead to adverse impact for such selection ratios. Cutoff scores that result in adverse impact against ethnic minority candidates should be lowered to reduce adverse impact.

Due to factors beyond their control, agencies following either of the above methods of setting a cutoff score may find themselves faced with having to set a cutoff that is below the recommended minimum acceptable score (115). For example, this could happen if there are a few candidates compared to the number of job openings. For the Probation Officer Examination, cutoff scores will be below the recommended minimum score whenever the examination is used to make selection decisions that allow 60% or more of candidates to go to the next step. There are several alternative strategies for dealing with such situations. One is to place the Probation Officer Examination earlier in the overall selection process if possible. The nearer the examination is to the beginning of the selection process, the more restrictive the cutoff score that can be set.

If relocating the Probation Officer Examination is not feasible, or if the cutoff score remains below the recommended minimum acceptable score despite the exam having been relocated, an alternative strategy is to recruit more candidates. By increasing the number of candidates for a position the necessary overall selection ratio can be lowered, with a resulting increase in the cutoff score.

Another strategy is to allow the cutoff score to be below the minimum acceptable score. No harm is done to the technical quality of the Probation Officer Examination as a result. (Recall that the minimum acceptable score is <u>not</u> a minimum competency cutoff). If this strategy is adopted, it must be done in full cognizance of the fact that some of the candidates selected will have less than a 50/50 chance of proving to be successful probation officers.

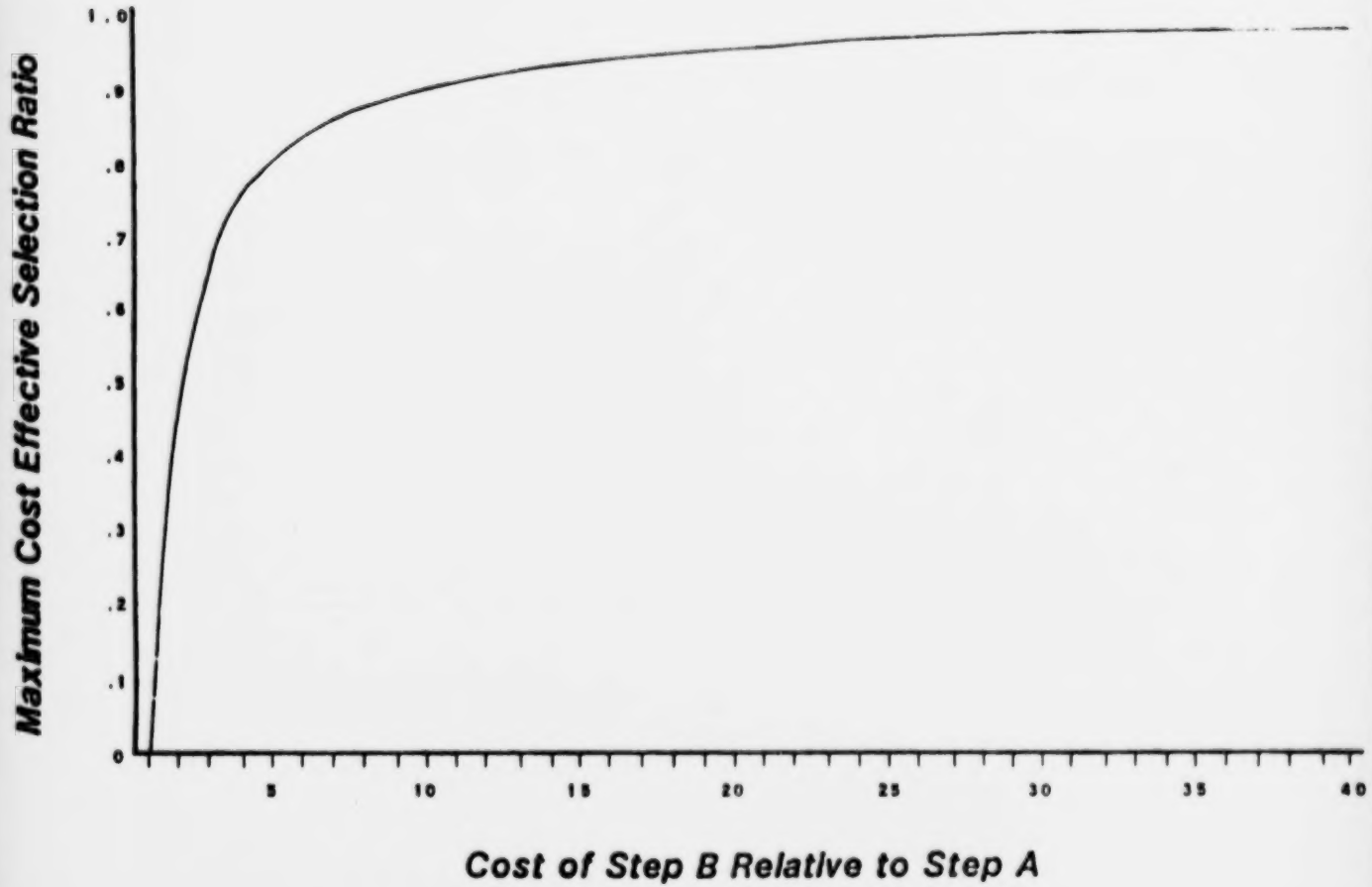
For any selection procedure, as the selection ratio approaches 1.0, the procedure loses its cost effectiveness. The cost effectiveness of the Probation Officer Examination is not an issue for cutoff scores above 115. As the cutoff drops below the recommended minimum acceptable score, the cost effectiveness of testing should be considered.

It is recommended that agencies that find it necessary or desirable to set a cutoff score below 108 consider the cost effectiveness of the Probation Officer Examination prior to its implementation. This may be done by comparing the cost of testing all candidates and interviewing only those that pass with the cost of not testing and simply interviewing all candidates. Whether testing will be found cost effective in such a comparison is a joint function of the relative costs of testing and interviewing and the cutoff score (selection ratio) set for testing. Figure 2 is provided as an aid to evaluating the cost effectiveness of the Probation Officer Examination.

Figure 2 shows the maximum cost effective selection ratio as a function of relative selection costs. Once the relative costs of interviewing and testing are known, Figure 2 allows agencies to determine the maximum (least restrictive) selection ratio that will maintain the cost effectiveness of testing. As can be seen, as the cost of step B (e.g., interviews) increases relative to the cost of step A (e.g., testing), virtually any selection ratio makes testing cost effective.

Of course cost effectiveness is not the only criterion that influences an agency's decision to use a particular selection procedure. The value of the information a procedure provides, its validity, and many other criteria must also be weighed in order to fairly judge the worth of any selection procedure. The Probation Officer Examination competes favorably with other selection procedures on all such criteria. Thus, as shown in Figure 2, the Probation Officer Examination will nearly always be a beneficial addition to any selection process.

Figure 2. Maximum Cost Effective selection ratio as a function of relative selection costs.



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